

## **15.0 MIDDLE COLUMBIA RIVER STEELHEAD**

### **15.1 BACKGROUND**

#### **15.1.1 Description of ESU**

The Middle Columbia River (MCR) steelhead ESU was listed as threatened under the ESA on March 25, 1999 (64 FR 14517). The ESU includes all naturally spawned populations of steelhead in streams from above the Wind River, Washington, and the Hood River, Oregon (exclusive), upstream to, and including, the Yakima River, Washington. Steelhead from the Snake River Basin are not included in this ESU. The TRT identified 16 populations in four major groupings delineated primarily by geographic proximity in the ESU.

#### **15.1.2 Status of the ESU**

The BRT reviewed the MCR steelhead in 1998 and 1999 (BRT 1998; BRT 1999) and identified several concerns including relatively low spawning levels in those streams for which information was available, a preponderance of negative growth rate trends (10 out of 14), and the widespread presence of hatchery fish throughout the ESU.

The 1999 BRT review specifically identified “...the serious declines in abundance in the John Day River Basin...” as a point of concern given that the John Day system had supported large populations of naturally spawning steelhead in the recent past. Concerns were also expressed about the low abundance of returns to the Yakima River system relative to historical levels “...with the majority of production coming from a single stream (Satus Creek).” The sharp decline in the returns to the Deschutes River system was also identified as a concern. The 1999 BRT review also identified increases of stray steelhead into the Deschutes River as a “major source of concern.” The review acknowledged that initial results from radio tagging studies indicated that a substantial proportion of steelhead entering the Deschutes migrated out of the system prior to spawning.

More recently, in 2003, the BRT reviewed the status of MCR steelhead and concluded that based on their evaluation of the natural population, the ESU remained in the “likely to become endangered” category (i.e., threatened). The BRT identified that “... the status of different populations within the ESU varies greatly. On the one hand, the abundance in two major basins, the Deschutes and John Day, is relatively high, and over the last 5 years, is close to or slightly over the interim recovery targets (Lohn 2002). On the other hand, steelhead in the Yakima basin, once a large producer of steelhead, remain severely depressed (10% of the interim recovery target), in spite of increases in the last 2 years. Furthermore, in recent years, escapement to spawning grounds in the Deschutes River has been dominated by stray, out-of-basin (and largely out-of-ESU) fish—which raises substantial questions about genetic integrity and productivity of the Deschutes population.” The BRT concluded that the relatively abundant and widely distributed resident fish mitigated extinction risk in this ESU somewhat. However, due to significant threats to the anadromous component the majority of BRT members concluded the

ESU was likely to become endangered (i.e., threatened) (BRT 2003).

## **15.2 ASSESSMENT OF THE HATCHERY PROGRAMS**

The following section presents a summary of artificial propagation programs in the MCR steelhead ESU which release steelhead. The broodstock history, similarity between hatchery-origin and natural-origin fish, program design, and program performance are described by population as listed in Table 15.1.

### **15.2.1 Middle Columbia River Steelhead (*O. mykiss*) ESU**

There are nine hatchery programs that release summer and winter steelhead within the MCR steelhead ESU (Table 15.1). Of this total, four programs release summer steelhead that are included in the MCR steelhead ESU (Table 15.1). Five programs release steelhead that are not included in the ESU. All of these programs are designed to mitigate for lost harvest opportunities associated with habitat degradation and the construction and operation of dams within the tributaries and the mainstem Columbia River.

#### **15.2.2 Umatilla River Summer Steelhead**

##### **15.2.2.1 Umatilla River Summer Steelhead Program**

**15.2.2.1.1 Broodstock History.** Broodstock are collected from unmarked summer steelhead returning to the Threemile Dam (TMD) trap on the Umatilla River. If the broodstock goal of 110 adults is not achieved, up to 10 coded-wire tagged program fish can be incorporated into the broodstock (the coded-wire tagged steelhead are collected at the trap for monitoring purposes). Out of basin summer steelhead (Skamania stock) were released into the basin prior to 1981. Since then only Umatilla summer steelhead have been used.

**15.2.2.1.2 Similarity Between Hatchery-origin and Natural-origin Fish.** Program summer steelhead are derived from unmarked summer steelhead returning to the basin, they may differ in that all program releases are one-year smolts, compared to two-year smolts for natural-origin summer steelhead.

**15.2.2.1.3 Program Design.** The program was designed to enhance the natural-origin population through supplementation, and to provide sustainable harvest in the Umatilla River basin. The annual production goal is for a release of 150,000 smolts. Smolts are adipose fin-clipped to allow for selective fisheries and to monitor returns to TMD. Smolts are acclimated and released at the Minthorn and Bonifer acclimation ponds. A third acclimation site near Pendelton is also used. Under the monitoring and management plan the number of hatchery-origin adults spawning naturally is not limited and has ranged from 6.7% to 59.1% from 1988 to 2002, and has averaged less than 30% from 2000 to 2002 (APRE report).

**Table 15.1.** Historical population structure and artificial propagation programs for Middle Columbia River Steelhead (*O. mykiss*) populations.

Historic Population	Programs Integrated with Historic Population	Programs releasing non-ESU steelhead (segregated)	Included in ESU?	Program Release (smolt unless otherwise noted)	Year initiated
<b>Summer Steelhead</b>					
Umatilla River	Umatilla River Summer Steelhead		Yes	150,000	1992
Walla Walla River		Walla Walla River Summer Steelhead Program (Lyons Ferry stock)	No	100,000	1983
Touchet River	Touchet River Endemic Summer Steelhead Program		Yes	50,000	2000
		Lyons Ferry Summer Steelhead Program	No	85,000	1983
Klickitat River		Skamania Stock Summer Steelhead Program	No	100,000	
Upper Yakima River	Yakima River Summer Steelhead Kelt Reconditioning Program		Yes	Adult releases	2000
Toppenish Creek					
Satus Creek					
Naches River					
Deschutes River - West Side	Deschutes River Summer Steelhead Program		Yes	162,000	1974
Deschutes River - East Side					
White Salmon River		Skamania Stock Summer Steelhead Program	No	20,000	
John Day River Mainstem Lower Tributaries					
North Fork John Day River					
John Day River Upper Mainstem Tributaries					
South Fork John Day River					
Middle Fork John Day River					
<b>Winter Steelhead</b>					
Klickitat River					
White Salmon River		Skamania Stock Winter Steelhead Program	No	20,000	
Fifteenmile Creek					
Rock Creek					

**15.2.2.1.4 Program Performance.** The stray rate for program summer steelhead has not been estimated. The smolt to adult survival rate has ranged from 0.08-0.91% for the 1991 to 1995 broodyears (APRE reports). The annual return of program summer steelhead to TMD averaged over 1,100 from 1999 to 2003. Harvest has not meet expectations with less than 100 steelhead caught annually from 1994 to 1999. Natural-origin summer steelhead returns for the same period averaged almost 2,300 annually. This program is funded by the BPA through the Fish and Wildlife Program.

**15.2.2.1.5 VSP Effects.** The net effect of this program is unknown but the program has increased the number of naturally spawning adults. The use of natural-origin steelhead for broodstock should reduce the potential for divergence of the hatchery-origin summer steelhead from the natural-origin fish.

### **15.2.3 Walla Walla River Summer Steelhead**

#### **15.2.3.1 Walla Walla River Summer Steelhead Program (Lyons Ferry Stock)**

**15.2.3.1.1 Broodstock History.** Smolts released into the Walla Walla River are from the Lyons Ferry Hatchery (LFH). The stock is derived from Wells Hatchery stock and Wallowa Hatchery stock and is not included in the MCR steelhead ESU.

**15.2.3.1.2 Similarity Between Hatchery-origin and Natural-origin Fish.** This is an isolated program with the goal of segregating program fish from naturally spawning summer steelhead.

**15.2.3.1.3 Program Design.** The goal of the program is to return 900 adult summer steelhead to the Walla Walla River for harvest to meet mitigation obligations under the Lower Snake River Compensation Plan (LSRCP). To meet this goal, 125,000 LFH summer steelhead smolts are released annually into the Walla Walla River. These fish are adipose fin-clipped with approximately 20,000 marked with an adipose/left ventral clip and coded-wire tagged. Smolts are not acclimated but direct stream released into the Walla Walla River at Rkm 56.3 (below the town of Walla Walla). These releases are below any natural production areas. Releases have been reduced from past levels (1996-2000 releases averaged approximately 170,000) to address ESA concerns and because smolt to adult survival rates were greater for steelhead released in the Walla Walla River than for the indicator steelhead released through the LSRCP in the Snake River. In previous biological opinions NOAA Fisheries proposed the elimination of the LFH stock summer steelhead by 2008, concurrent with the development of a new stock from local populations. Genetic analysis is continuing to identify populations that could be used for this purpose.

**15.2.3.1.4 Program Performance.** Stray rates for this program have not been estimated, though low numbers of hatchery steelhead are recovered in the South Fork Walla Walla River, upstream of the releases site. The proportion of hatchery-origin steelhead captured at the Nursery Bridge Trap averaged 4.42% for the 1995-96 to 1999-00 return years. The trend has been declining as natural-origin adult returns increase. Returning program summer steelhead do spawn naturally but in areas in the lower Walla Walla River that are unsuitable for steelhead production. The

averaged smolt to adult survival rate for program summer steelhead was 1.12% for the broodyears 1989, and 1992-1994. The harvest of summer steelhead in the Walla Walla River and Mill Creek averaged almost 1,200 summer steelhead annually for the 2000 to 2002 returns. The program is exceeding its mitigation goal and that is why releases have been reduced. The Walla Walla River basin was in the top ten river basins for summer steelhead harvest in Washington. The endemic summer steelhead program in the Touchet River is evaluating local broodstocks to replace LFH summer steelhead releases. The program is funded through the LSRCP and is expected to continue.

**15.2.3.1.5 VSP Effects.** The net effect is probably negative if the out of ESU hatchery steelhead spawn with the natural-origin summer steelhead, this can reduce the genetic diversity of the reference population. Interactions have been limited by releasing program fish below the mouth of Mill Creek and by the reduction in the total number of smolts released. Impacts can be further reduced through the development of a locally adapted broodstock.

## **15.2.4 Touchet River Summer Steelhead**

### **15.2.4.1 Touchet River Endemic Summer Steelhead Program**

**15.2.4.1.1 Broodstock History.** The program started in 2000 by collecting natural-origin steelhead at the Dayton Adult Trap (Rkm 85.8). The broodstock has been all unmarked adults, though the natural production could have come from natural spawning LFH summer steelhead released into the basin. Genetic data indicates that the Touchet River summer steelhead are distinct from LFH summer steelhead (data from HGMP).

**15.2.4.1.2 Similarity Between Hatchery-origin and Natural-origin Fish.** The broodstock is collected from the natural-origin population, but are released at a different age than natural-origin smolts.

**15.2.4.1.3 Program Design.** The goal of the program is to return 750 adult summer steelhead to the Touchet River for harvest to meet mitigation obligations under the LSRCP. LFH summer steelhead have been used to meet this obligation but NOAA Fisheries has stated in past Opinions that the release of non-ESU summer steelhead should be discontinued and the program shifted to using local stock summer steelhead. The Touchet River endemic program was initiated to evaluate the feasibility of using natural-origin summer steelhead for broodstock to replace LFH production. Adults are collected at the Dayton Pond diversion dam trap and spawned and reared at LFH, then returned to the basin. Current program production is direct stream released into the upper Touchet River, future production will be acclimated at the Dayton Pond facility. The initial program goal was for releases of 50,000 smolts. A decision to expand the program to full production of 150,000 smolts will be made in 2004 and based on returns and rearing success of the program summer steelhead. Broodstock collection and management of adults returning to the basin have been hindered by an inadequate adult trap at the Dayton Pond diversion dam. The trap was inefficient in collecting adults, with adults able to bypass the trap during most spring time flows. The trapping efficiency has improved in recent years, but for this program to be successful the fish ladder and trap at the diversion must be modified. Smolts for the initial

program release were marked with a coded-wire tag and visual implant elastomer tag and any returning adults will be passed upstream to spawn naturally. If the production level increases to 150,000 smolts, then no more than 35% of the broodstock would be first generation program adults. The annual production achieved would be dependent on the number of natural-origin adults returning to the trap.

**15.2.4.1.4 Program Performance.** The program was initiated with the 2000 broodyear, returns are expected in 2003 and 2004. Currently data is not available on the program returns. The proportion of hatchery fish above the Dayton pond diversion dam averaged 15.8% from 1998 to 2001, these are LFH summer steelhead (MCR FMEP). With a better trap these adults can be removed and prevented from spawning in the upper Touchet River basin. Program releases have averaged over 46,800 annually for the first 4 broodyears. The program is funded through the LSRCP and is expected to continue.

**15.2.4.1.5 VSP Effects.** The net effect of this program is unknown because the program was started with the 2000 brood. The program may be beneficial by increasing the abundance of the reference population; however there is some concern with the potential number of program fish on the spawning grounds. The program should also provide a benefit by reducing the number of out of ESU summer steelhead released in the basin.

#### **15.2.4.2 Lyons Ferry Summer Steelhead Program**

**15.2.4.2.1 Broodstock History.** Smolts released into the Walla Walla River are from the Lyons Ferry Hatchery (LFH). The stock is derived from Wells Hatchery stock and Wallowa Hatchery stock and is not part of the MCR steelhead ESU.

**15.2.4.2.2 Similarity Between Hatchery-origin and Natural-origin Fish.** This is an isolated program with the goal of segregating program fish from naturally spawning summer steelhead.

**15.2.4.2.3 Program Design.** The goal of the program is to return 750 adult summer steelhead to the Touchet River for harvest to meet mitigation obligations under the Lower Snake River Compensation Plan (LSRCP). The current production goal is a release of 85,000 smolts that are acclimated at the Dayton Pond facility. The production goal has declined from 125,000 smolts prior to 2001 to 100,000 from 2001 to 2003. Currently all production is adipose fin-clipped to allow for selective fisheries.

**15.2.4.2.4 Program Performance.** The stray rate for LFH summer steelhead has not been estimated. However, the proportion of hatchery fish (LFH stock) above the Dayton pond diversion dam averaged 15.8% from 1998 to 2001. This should decline as total releases decline and are replaced by the endemic program. Steelhead spawning and rearing habitat is very limited below the Dayton Pond release site (Rkm 85.8), with the exception of Coppei Creek which enters the Touchet River at Rkm 67.6. Monitoring of natural production below Dayton and in Coppei Creek has been initiated to determine if hatchery-origin summer steelhead are spawning in the lower Touchet River. The smolt to adult survival rate for Touchet River releases averaged 1.44% for the 1994 to 1997 broodyears, and ranged from 0.53 to 2.36%. Harvest of LFH summer

steelhead averaged 490 adults for the 2000 to 2002 returns, with 813 harvested in 2002. The program is funded through the LSRCP and is expected to continue.

**15.2.4.2.5 VSP Effects.** The net effect is probably negative if the out of ESU hatchery steelhead spawn with the natural-origin summer steelhead, this can reduce the genetic diversity of the reference population. Interactions have been limited by releasing program fish below Dayton and by the reduction in the number of smolts released. The potential impacts are expected to be further reduced through development and use of the endemic broodstock.

## **15.2.5 Klickitat River Summer Steelhead; Klickitat River Winter Steelhead**

### **15.2.5.1 Klickitat Summer Steelhead Program (Skamania Stock)**

**15.2.5.2.2 Broodstock History.** Smolts for this program are from broodstock collected from returns to the Skamania Hatchery on the West Fork of the Washougal River. Broodstock was derived from summer steelhead from the Washougal and Klickitat rivers.

**15.2.5.1.2 Similarity Between Hatchery-origin and Natural-origin Fish.** This is an isolated program and the hatchery summer steelhead are segregated from the natural-origin summer steelhead. This is a highly domesticated hatchery stock that has used returns to the hatchery as broodstock for decades. Therefore, little similarity between hatchery-origin and natural-origin is expected.

**15.2.5.1.3 Program Design.** The program goal is to provide fisheries for summer steelhead in the Klickitat River as mitigation for hydro-system development and habitat loss and to meet obligations under *U.S. v. Oregon*. The program goal is for an annual release of around 100,000 smolts. These are all adipose fin-clipped to allow for selective fisheries. The steelhead are not acclimated but direct stream released at a number of locations in the lower Klickitat River (Rkm 16.1, 29.0, 40.3, and 45.1). The Yakama Tribe is developing a plan to use endemic Klickitat River steelhead for broodstock in a program to replace the current Skamania stock releases. The program will collect broodstock at the Lyles Falls Fishway trap that is currently being remodeled. The trap will be instrumental in determining the status of the natural-origin and hatchery-origin steelhead in the Klickitat River.

**15.2.5.1.4 Program Performance.** Stray rates have not been estimated for this program. The status of the natural-origin summer and winter steelhead populations in the Klickitat River is unknown and this is a concern because the potential impacts from the release of Skamania stock summer steelhead can not be evaluated. The smolt to adult survival has not been estimated for program releases. The recreational harvest of summer steelhead in the Klickitat River averaged over 1,820 adults and the basin was in the ten summer steelhead rivers in 2001 and 2002. This program is funded through the Mitchell Act and future funding of this program is uncertain.

**15.2.5.1.5 VSP Effects.** The net effect of this program is unknown. The status of the natural-origin populations needs to be determined before the effects of these program fish can be evaluated. This program could have an adverse effect on the reference populations if program

fish interbreed with the natural-origin populations. It is still unknown whether Skamania stock summer steelhead successfully spawn and produce juveniles that can interact with natural-origin juveniles.

## **15.2.6 Upper Yakima River Summer Steelhead; Toppenish Creek Summer Steelhead; Satus Creek Summer Steelhead; Naches River Summer Steelhead**

### **15.2.6.1 Yakima Summer Steelhead Kelt Reconditioning Program**

**15.2.6.1.1 Broodstock History.** Kelts are collected for this program at the Chandler Juvenile Evaluation Facility (CJEF) (Rkm 48) and are transported to the Prosser Fish Hatchery. These are all natural-origin adults from the different populations within the Yakima River basin. The last release of hatchery steelhead was in the early 1990s.

**15.2.6.1.2 Similarity between Hatchery-origin and Natural-origin Fish.** These are natural-origin adults that have spawned and are emigrating downstream and should similar to natural-origin summer steelhead in the reference populations.

**15.2.6.1.3 Program Design.** This is a research program designed to evaluate use of the kelt reconditioning to enhance iteroparity of steelhead in the Columbia River basin. Approximately 40% of the emigrating adult steelhead are collected at the Chandler Juvenile Facility at Prosser with over 90% of those female. The kelts are examined for condition and life stage (pre or post spawn). If the female kelt meets the established criteria it is it is transferred to Prosser Hatchery adjacent to the collection facility. Fish are treated for parasites and injected with antibiotics then placed in rearing tanks. A variety of diets and feeding methods have been tested. Various release strategies are being evaluated using PIT tags and Radio tag information. Two groups are short term reconditioned and transported below Bonneville Dam, one group is full term reconditioned and released below McNary Dam and a final group is full term reconditioned and released in the Yakima River. Data is currently being collected on each release group to determine effectiveness.

**15.2.6.1.4 Program Performance.** Survival rates to release have improved since the beginning of the program. Survival in 2000 was 18% with only 12% of the fish collected rematuring. This has improved to 62% surviving and 57% rematuring in 2003. The survival in the short term reconditioning tests was 83% in 2002 and 90% in 2003. In 2002, 820 kelts were collected and 400 were used for the short term test and 420 were used for the long term reconditioning. A portion of program fish that were released into the Yakima River basin were radio tagged and observed spawning naturally. The program is funded by the BPA through the Fish and Wildlife Program.

**15.2.6.1.5 VSP Effects.** The net effect of this program has been to increase the number of naturally spawning summer steelhead in the basin. Increasing the proportion of the run that repeat spawns may alter the diversity of the natural-origin population and this effect should be monitored. Results of this research will be applicable to other steelhead recovery efforts.



## **15.2.7 Deschutes River Summer Steelhead - West side; Deschutes River Summer Steelhead - Eastside**

### **15.2.7.1 Deschutes River Summer Steelhead Program (Round Butte Hatchery)**

**15.2.7.1.1 Broodstock History.** Broodstock for this program is collected at the Pelton Trap, downstream of the Pelton Regulating Dam (Rkm 161.1). Broodstock for this program only uses known Round Butte Hatchery steelhead as a precaution against introducing disease.

**15.2.7.1.2 Similarity Between Hatchery-origin and Natural-origin Fish.** The program has not incorporated natural-origin adults into the broodstock since the 1997-98 return year. Natural-origin summer steelhead from outside the basin were intercepted at Sherars Falls when collecting broodstock, but it was found that they may have been infected with whirling disease. This concern prevents the program from using unmarked steelhead in the broodstock.

**15.2.7.1.3 Program Design.** The purpose of the program is to maintain the supply of fish to the fishery that would otherwise have been lost because of habitat degradation or blocked access to natural spawning areas above Round Butte Dam. The program will also support a re-introduction program in the Deschutes River basin above the dams. The mitigation goal is for a return of 1,800 adult summer steelhead to the project. This can be met on averaged with a release of 162,000 smolts. The production is adipose fin and maxillary clipped to allow for selective fisheries and to identify program summer steelhead at the Pelton trap. The program also provides juveniles for Acatchable® trout fisheries in Lake Simstustus above the Round Butte Dam. Program juveniles are used because they are locally adapted (disease resistant) and if they due escape to below the dams, they are the same as program juveniles. Smolts are trucked from Round Butte Hatchery and released at the Pelton Trap. The production of smolts and the number adults collected at the Pelton Trap may increase to support the re-introduction efforts.

**15.2.7.1.4 Program Performance.** Stray rates for program fish have not been estimated, but as an indicator, less than six program adult steelhead have been captured at the Warm Springs NFH trap from run year 1982 through run year 2002. The Warm Spring River is the largest westside tributary to the Deschutes River, the other tributaries have not been monitored. The estimated smolt to adult survival has varied from 0.20% to 7.74% and has averaged 2.64% from the 1987 to the 1999 brood year. The returns of RBH origin steelhead to the Pelton Trap ranged from 190 to 6,811 and averaged 2,317 for a period of 32 years. Funding for this program is approximately 79 % from Portland General Electric and 21% from BPA.

**15.2.7.1.5 VSP Effects.** The net effect of this program is unknown but could be potentially adverse if the program summer steelhead diverged from the reference population. The problem is due to not incorporating natural-origin adults into the broodstock. There is a legitimate concern regarding the origin of unmarked steelhead in the Deschutes River. In some years thousands of non-ESU unmarked summer steelhead enter the Deschutes River to hold before continuing their migration up the Columbia River. Unmarked adults used for broodstock could be from out of the ESU causing further impacts. If natural-origin adults are required to maintain the program then a

method of identification using mitochondrial DNA should be developed for this program. Technologies are improving to make this feasible.

## **15.2.8 White Salmon River Summer Steelhead; White Salmon River Winter Steelhead**

### **15.2.8.1 Skamania Summer Steelhead Program**

**15.2.8.1.1 Broodstock History.** Smolts for this program are from broodstock collected from returns to the Skamania Hatchery on the West Fork of the Washougal River. Broodstock was derived from summer steelhead from the Washougal and Klickitat Rivers.

**15.2.8.1.2 Similarity Between Hatchery-origin and Natural-origin Fish.** This is an isolated program and the hatchery summer steelhead are segregated from the natural-origin summer steelhead. This is a highly domesticated hatchery population that has used returns to the hatchery as broodstock for decades.

**15.2.8.1.3 Program Design.** The program goal is to provide fisheries for summer steelhead in the White Salmon River as mitigation for hydro-system development and habitat loss and to meet obligations under *U.S. v. Oregon*. The program production goal is for an annual release of 20,000 smolts. The production is adipose fin-clipped to allow for selective fisheries. The smolts are trucked from the Skamania Hatchery and direct stream released into the White Salmon River at Rkm 2.4. The program changed in 2004, prior to this year, program fish were released into Drano Lake, a back water of the Columbia River at the mouth of the Little White Salmon River. When Condit Dam is removed an alternative to this program must be developed because program fish are not part of the ESU and would not be appropriate for re-introduction.

**15.2.8.1.4 Program Performance.** Stray rates for this program have not been estimated. Natural production in the White Salmon River is limited to the lower river below Condit Dam. The historical spawning and rearing habitat was above the dam. Natural production has not been estimated, but is probably very low. Smolt to adult survival rates have not been estimated but harvest of summer steelhead averaged 3,889 from 2000 to 2002. The White Salmon River was in the top ten rivers in Washington State for summer steelhead harvest in 2001 and 2002. This program is funded through the Mitchell Act and future funding of this program is uncertain.

**15.2.8.1.5 VSP Effects.** The net effect of this program on the reference population is probably neutral. The hatchery-origin program fish return to the White Salmon River below Condit Dam where there is little, if any natural spawning habitat. Therefore, abundance of natural-origin steelhead is likely not effective.

### **15.2.8.2 Skamania Winter Steelhead Program**

**15.2.8.2.1 Broodstock History.** Smolts for this program are from broodstock collected from returns to the Skamania Hatchery on the West Fork of the Washougal River. Broodstock was derived from summer steelhead from the Washougal and Klickitat rivers.

**15.2.8.2.2 Similarity Between Hatchery-origin and Natural-origin Fish.** This is an isolated program and the hatchery summer steelhead are segregated from the natural-origin summer steelhead. This is a highly domesticated hatchery population that has used returns to the hatchery as broodstock for decades.

**15.2.8.2.3 Program Design.** The program goal is to provide fisheries for winter steelhead in the White Salmon River as mitigation for hydro-system development and habitat loss and to meet obligations under *U.S. v. Oregon*. The program production goal is for an annual release of 20,000 smolts. The production is adipose fin-clipped to allow for selective fisheries. The smolts are trucked from the Skamania Hatchery and direct stream released into the White Salmon River at Rkm 2.4. When Condit Dam is removed an alternative to this program must be developed because program fish are not part of the ESU and would not be appropriate for re-introduction.

**15.2.8.2.4 Program Performance.** Stray rates for this program have not been estimated. Natural production in the White Salmon River is limited to the lower river below Condit Dam. The historical spawning and rearing habitat was above the dam. Natural production has not been estimated, but is probably very low. Smolt to adult survival rates have not been estimated and the annual harvest of winter steelhead averaged over 160 adults from 1999 to 2001, with the best harvest of 332 occurring in 2001. This program is funded through the Mitchell Act and future funding of this program is uncertain.

**15.2.8.2.5 VSP Effects.** The net effect of this program on the reference population is probably neutral. The program fish return to an area with very little if any natural spawning habitat. Natural production is very low and has probably resulted from program fish.

## 15.3 CONCLUSION

**Existing Status:** Threatened  
**BRT Finding:** Threatened  
**Recommendation:** Threatened

### 15.3.1 ESU Overview

**15.3.1.1 History of Populations.** The original number of populations is uncertain. Round Butte Dam on the Deschutes River blocked access to Squaw Creek, Metolius River, Crooked River, and upper Deschutes River, it is unknown if these represented individual populations. Condit Dam on the White Salmon River may have eliminated both winter and summer steelhead populations. Habitat degradation in this ESU may have also eliminated historic populations or severely curtailed their distribution. The TRT tentatively identified 20 populations of which two are putatively extinct though some spawning habitat remains (White Salmon River Summer Steelhead and White Salmon River Winter Steelhead).

Remaining summer steelhead populations are: Umatilla River, Walla Walla River, Touchet River, Upper Yakima River, Toppenish Creek, Satus Creek, Naches River, John Day River Mainstem Tributaries, North Fork John Day River, John Day River Upper Mainstem, South Fork John Day River, Middle Fork John Day River, Deschutes River Westside Tributaries, Deschutes River Eastside Tributaries, Klickitat River, Rock Creek and White Salmon River. Remaining winter steelhead populations are: Klickitat River, White Salmon River and Fifteenmile Creek.

#### **15.3.1.2 Association Between Natural Populations and Artificial Propagation.**

##### **Natural populations “with minimal genetic contribution from hatchery fish”**

There are ten listed natural populations in this ESU that are likely to be subject to minimal or no genetic influence from hatchery-origin fish. Nine of these populations are summer steelhead: Upper Yakima River, Toppenish Creek, Satus Creek, Naches River, John Day River Mainstem Tributaries, North Fork John Day River, John Day River Upper Mainstem, South Fork John Day River, and Middle Fork John Day River. The one winter steelhead population is Fifteenmile Creek.

##### **Natural<sup>1</sup> populations “that are stable or increasing, are spawning in the wild, and have adequate spawning and rearing habitat”<sup>2</sup>**

The Upper Yakima River, Toppenish Creek, Satus Creek, Naches River, and the Fifteenmile Creek natural populations may be considered stable or increasing (as determined by short term population growth trends and geometric mean

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<sup>1</sup> See HLP for definition of natural, mixed and hatchery populations

<sup>2</sup> HLP Point 3

abundances (BRT 2003)). These populations are spawning in the wild, and having adequate spawning habitat. The Yakima River populations as a group are increasing, but are still only achieving on average 20% of the interim abundance target of 8,900 adults. In the John Day River basin only the North Fork population has shown an increasing growth trend, while the other four populations do not have positive short term growth trends.

#### **Mixed (Integrated Programs)<sup>3</sup>**

Mixed (aggregate natural and hatchery-origin) steelhead populations in the ESU are: Umatilla River Summer Steelhead Program, Touchet River Endemic Summer Steelhead Program, Yakima River Summer Steelhead Kelt Reconditioning Program and Deschutes River Summer Steelhead Program.

#### **Hatchery (Isolated)<sup>4</sup>**

Walla Walla Summer Steelhead Program, Lyons Ferry Summer Steelhead Program (Touchet River), Skamania Stock Summer Steelhead Programs: Klickitat River and White Salmon River; and Skamania Stock Winter Steelhead (White Salmon River).

### **15.3.2. Summary of ESU Viability**

**15.3.2.1 Abundance.** Estimated natural-origin returns and the total number of natural spawners (i.e., the combination of natural-origin and hatchery-origin chinook included in the ESU) have increased since 1999 when the ESU was listed as threatened (Table 15.2). However, average total (aggregate natural and hatchery-origin steelhead) escapements to natural spawning areas for the most recent ten years remain well below interim target abundance levels for most the populations (Table 15.2). Furthermore, only eight out of the 20 populations have hatchery programs that may contribute positively to abundance. Four of the eight populations that may be improved by hatchery programs are affected only by the Yakima kelt reconditioning program which is relatively new and while early indications are positive, the long term benefits are unknown. Furthermore, funding for this program is not certain.

**15.3.2.2 Productivity.** The BRT (2003) did not identified productivity as a major risk factor but

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<sup>3</sup> Integrated programs follow practices designed to promote and protect genetic diversity and only use fish from the same local population for broodstock (both natural-origin fish, whenever possible, and hatchery-origin fish derived from the same local population and included in the ESU). Programs operated to protect genetic diversity in the absence of natural-origin fish (e.g., captive broodstock programs and the reintroduction of fish into vacant habitat) are considered “integrated”.

<sup>4</sup> Isolated programs do not follow practices designed to promote or protect genetic diversity. Fish that are reproductively isolated are more likely to diverge genetically from natural populations included in the ESU and to be excluded themselves from the ESU.

did find that productivity was the different populations varied greatly. We are aware of no data indicating hatchery programs have increased ESU productivity. In the BRT (2003) analysis, when it was assumed that hatchery-origin adults contributed to the natural spawning population, productivity estimates for those populations declined (Deschutes River, Umatilla River, Touchet River populations).

**15.3.2.3 Spatial Structure.** The spatial structure of the ESU has not been increased by artificial propagation programs. Programs in this ESU are releasing summer steelhead into habitats that are already occupied by natural populations.

**15.3.2.4 Diversity.** The integrated propagation programs in the Yakima, Umatilla and Touchet Rivers appear to be preserving summer steelhead stock structure. The Touchet River endemic summer steelhead may be supporting diversity by reducing releases of non-ESU summer steelhead. The Deschutes River program is probably maintaining some of the genetic resources that were found above Round Butte Dam. The continued release of Lyons Ferry Hatchery stock, and Skamania stock steelhead into areas where natural populations are present remains a risk factor to the preservation of genetic diversity remaining among steelhead populations within the ESU.

### **15.3.3. Artificial Propagation Record**

**15.3.3.1 Experience with Integrated Programs.** The Umatilla River summer steelhead has been operation since the early 1980s, where as the Touchet River endemic steelhead program and the Yakima summer steelhead kelt reconditioning programs were initiated in 2000.

**15.3.3.2 Are Integrated Programs Self-Sustaining.** Currently the integrated programs in the Umatilla River and Yakima Rivers are self-sustaining, it is still uncertain if the Touchet River endemic steelhead program will be self-sustaining, major improvements at the Dayton Pond diversion dam are needed to ensure broodstock collection and monitoring natural production.

**15.3.3.3 Certainty that Integrated Programs will Continue to Operate.** Two of the integrated propagation programs in this ESU are funded by the BPA through the Fish and Wildlife Program, the Umatilla summer steelhead program is part of a larger propagation and monitoring project in the Umatilla River basin and has been funded from the early 1980s. This program, and the Yakima River summer steelhead kelt reconditioning program go through periodic review to continue to get funding and could lose funding if priorities change or BPA reduces funding to the Fish and Wildlife Program. The Touchet River endemic summer steelhead program is funded through the Lower Snake River Compensation Plan and is expected to have stable funding, though additional funding is needed to make improvements to the diversion dam trap. The Deschutes River summer steelhead program is funded as mitigation for the Deschutes River hydro-system and is expected for be funded into the future under the new FERC license for the dams.

### 15.3.4. Summary of Overall Extinction Risk Faced by the ESU

The overall abundance of the ESU has increased since the previous status review, but the increases have not been spread evenly throughout the populations. Adult returns to the Yakima River basin have increased but are still well below the interim abundance target and concentrated in only one of four populations. Artificial propagation programs have supported the increased abundance, particularly in the Umatilla and Deschutes Rivers. The Touchet River endemic summer steelhead program is too new to evaluate but has decreased the risk to diversity by reducing the number of non-ESU Lyons Ferry Hatchery summer steelhead being released into the Touchet River. The key issues that still need to be addressed include the continued release of non-ESU summer steelhead, the status of steelhead populations in Klickitat River basin, and the effect on the Deschutes River populations of out-of-basin steelhead spawning in the basin.

**Table 15.2.** Abundance by spawning year of natural-origin and hatchery-origin steelhead in the Middle Columbia steelhead ESU.

Columbia Steelhead ESC:											
	Upper John Day		Deschutes		Yakima	Umatilla		Walla Walla		Touchet	
Year	Nat.	Hat.	Nat.	Hat.	Nat.	Nat.	Hat.	Nat.	Hat.	Nat.	Hat.
1974	2,695	0									
1975	1,216	0									
1976	4,893	0									
1977	7,851	0									
1978	3,599	0	6,556	6,121							
1979	818	0	2,759	3,184							
1980	3,931	0	4,204	5,400							
1981	2,488	0	4,100	5,500							
1982	2,059	0	6,900	3,800							
1983	2,620	0	6,567	3,524							
1984	2,399	0	8,228	7,250	1,140						
1985	6,352	0	7,721	7,563	2,191						
1986	7,464	0	9,624	7,382	2,230						
1987	9,899	0	6,207	9,064	2,463					334	29
1988	9,593	0	5,367	9,209	2,838	2,315	165			1,006	88
1989	3,958	0	3,546	3,849	1,162	2,104	370			214	19
1990	3,754	0	4,278	2,758	845	1,422	245			332	29
1991	2,909	0	3,653	1,990	834	724	387			193	17
1992	5,123	47	4,826	3,778	2,263	2,247	522			374	32
1993	731	25	904	2,539	1,184	1,298	616	722	17	484	36
1994	2,237	76	1,487	1,159	554	945	345	423	2	358	19
1995	482	16	482	1,781	925	875	656	340	19	388	96
1996	1,270	43	1,662	2,708	505	1,296	785	257	15		
1997	1,083	37	3,458	5,932	1,106	1,014	1,463	231	18		
1998	2,406	82	1,820	5,042	1,113	862	903	302	12	474	53
1999	895	31	3,800	3,527	1,070	1,135	751	224	5	271	46
2000	2,215	76	4,790	2,628	1,296	2,160	732	410	12	217	56
2001	1,955	0	8,985	4,380	2,942	2,596	1,066	600		253	56
2002	3,809	358	8,749	9,373	4,525	3,562	1,958	1,205			
2003					2,201	2,045	1,029	547			

## 15.4 REFERENCES

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